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SOURCE Veterinariya, Nol XXVII, No 6 1950.EQUINE INFECTIOUS ANEMIA

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[Digest]

The assumption that equine infectious anemia is due exclusively to a filterable virus contained in the blood and organs of diseased horses has obstructed further research on the causative factor of this disease because of the antievolutionary metaphysical approach to the question of transmutation of filterable viruses into microbes and of microbes into filterable viruses. Hitherto the measures for combating equine infectious anemia were based on the theory that the disease is highly contagious, that sick horses cannot, as a rule, be cured and should be exterminated, and that horses which have had the disease remain virus carriers during the rest of their lives and therefore must be isolated from horses which did not have the disease and consequently are free from the virus. These measures proved largely ineffective. Besides, the method of diagnosis (a biotest) was very complicated and uncertain. There was no specific method of treatment.

Infectious equine anemia has been known for about 110 years. The presence of the disease was first established in the USSR in 1932.

Using methods developed by us, we have grown, in artificial nutritive media, a microscopically visible microbe from the filterable causative factor of the disease. We do not deny that this filterable causative factor is a virus. We have investigated and definitely established the basic stages of the development of the microbe referred to above, and have proven its identity with the filterable form of the causative factor producing equine infectious anemia.

Moreover, we have succeeded in transforming both the microbe form and the filterable form of the causative factor into crystals. The crystalline form, while retaining the functions of the living state, is extremely resistant to physicochemical and thermic influences acting upon it. Conversely, we have succeeded in transforming the crystalline form into the filterable and microbe forms.

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Our discovery of the interconversions mentioned above has enabled us to establish the distribution of the causative factor of infectious anemia in nature, to find that other animals besides horses are also capable of carrying the virus, and to develop more easily specific methods of diagnosis and treatment.

Starting our work in 1939, we proved in 1940-41 the transmutation of the purified filterable form of the virus into a nonfilterable form, establishing at the same time, that the purified virus has the appearance of small round grains under the microscope. We found that the breakdown of erythrocytes in diseased horses is a secondary phenomenon.

The virus initially destroys nucleated cells (leucocytes and reticulo-endothelial cells). The destruction of leucocytes takes place in the course of a violent struggle of the latter with the virus, particularly during the period of propagation of the virus in cells of the reticulo-endothelial system. Propagation of the virus in the body does not take place at the expense of erythrocytes, but through utilization of products of the metabolism of nucleated cells, i.e., nucleoproteids.

The reduction of the number of erythrocytes in the blood of a diseased horse takes place as a result of a disturbance of the blood-formative function owing to a toxic effect exerted on the blood-forming organs by products arising from the decomposition of virus nucleoproteids and from the breakdown of cell nuclei of the diseased horse.

In 1940, we proposed (Veterinariya, No 10, 1940, p 19), that the combined [literally "complex"] method of diagnosing infectious anemia be replaced with a color reaction based on the fact that the presence of nucleoproteids originating from nucleated cells becomes apparent upon addition of fuchsin sulfite or a reagent containing tryptophane to the serum of a diseased horse. Application of the color reaction enabled us to collect extensive material proving that the infection is much more widespread than had been previously assumed on the basis of the old method of diagnosis.

During 1947-49, we also proved by isolating the microbe form of the causative factor of infective anemia that this infection occurs widely among horses. By investigating the blood of 400 horses of which more than 50 percent were entirely healthy, we were able to establish that the microbe form of the causative factor of infectious anemia could be isolated from all of these horses. The pathogenic quality of the microbes isolated from healthy horses was confirmed by biotests carried out on foals. These biotests (20 of them) were positive in all instances. Moreover, we carried out a cross test starting with healthy horses and also obtained a positive result with even a lethal outcome.

Besides establishing the presence of the virus in healthy horses, we also isolated the causative factor from horned cattle, sheep, swine, rabbits, chickens, and dogs, confirming the pathogenicity in all cases by infecting foals [literally "by carrying out a biotest on foals"].

Horses do not become sick just because the virus is being carried; the animals which are affected must be exposed to an unfavorable environment. Experiments made by us and Comrades Rozhkov, Kartavtsev, Stepanov, and others demonstrate that, with proper care, infectious anemia does not appear and that animals which developed the disease on farms contaminated by it can be cured. These experiments have been carried out on a great number of horses.

We prepared equally effective and specific allergens (anemin) from both the purified virus and the microbe form of infectious anemia. By testing sick horses with anemin, a positive allergic reaction was obtained in 98 percent of the cases. By testing 1,000 healthy horses with this allergen, only four of them (0.4 percent) were found to exhibit a positive reaction. When the tests

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were carried out in an area where infectious anemia is prevalent, 70-80 percent of all horses (both sick and healthy) gave a positive allergic reaction. More than 60 diseased and positively reacting horses were killed and submitted to pathologicoanatomic and histological examinations. The results conformed completely with the indications of the allergic reaction. Biotests also confirmed the results of the allergic reaction.

The time necessary for a diagnosis by means of the allergic reaction amounts to 5-6 days. Two eye tests are carried out during that time.

We have prepared a prophylactic vaccine from the causative factor of infectious anemia. The efficacy of this vaccine was checked and proven on 40 healthy horses and foals under experimental (laboratory) conditions and also on 389 diseased horses which were cured and sent to farms where infectious anemia does not occur. Under the circumstances, we recommend vaccination of horses in areas affected by the disease.

In view of the facts that the virus of equine infectious anemia occurs widely in nature and that healthy horses and other animals may carry it, no useful purpose is served by excluding diseased horses from the farm or destroying them. Clinically diseased horses should be isolated from the rest of the horses on the farm and treated with specific biological preparations (the vaccine mentioned above) -- also symptomatically by using drugs which stimulate heart activity and raise the tonicity of tissues (spirits of camphor, camphor oil, caffeine, calcium chloride). In treating diseased horses and preventing the disease in healthy horses, particular attention must be paid to measures tending to improve the general condition of the animals and thus to increase their resistance.

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